

Electrophysiological Measures of Pesticide Toxicity to the Salmon Olfactory System

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Abstract

Three classes of current use pesticides altered peripheral and central neurophysiological responses of the coho salmon olfactory system to two natural odorants (L-serine and taurocholic acid). Juvenile salmon were exposed for seven days to 0.625 to 5.0 mg/L chlorpyrifos (organophosphate), 0.05 to 0.20 mg/L esfenvalerate (pyrethroid) or 5.0 to 20 mg/L copper (metal), and *in-vivo* field potential recordings were then measured from the olfactory epithelium (electro-olfactogram, EOG) and the olfactory bulb (electro-encephalogram, EEG), simultaneously. The pesticides altered odorant-evoked responses by reducing peak amplitude of the EOG and EEG, and/or by inducing post-stimulus burst activity measured in the olfactory bulb. Collectively, these data indicate that the salmon olfactory system is vulnerable to the neurotoxic effects of certain current use pesticides, and that *in vivo* electro-physiological recordings can provide a sensitive, quantitative, and reproducible measure of sensory impairment under environmentally realistic exposure conditions.